SAT803 User Manual

China Aerospace Telecommunications Limited

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1. Introduction

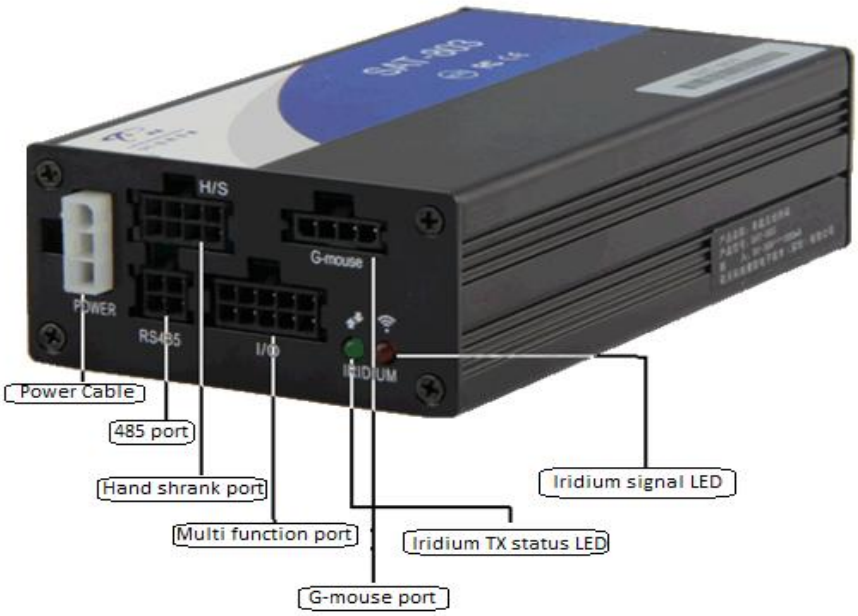
SAT-803 is a global GPS tracker with two communication modes(GPRS& Iridium), and it can choose them intelligently based on GPRS network's signal condition, which can both guarantee the communication and reduce the cost.

Iridium network can guarantee the data communication anywhere avoid influence of weather, elevation, ionized stratum and distance. It specially suits for marine affairs, aviation, remote area's vehicle and unattended station.

SAT-803 has structure of MCU+GPRS module G610+Iridium9602+G-Mouse. It is made up of main unit, G-Mouse, Iridium antenna, GSM antenna, power cable and relative optional accessories.

2. Overview

2.1 Main Unit



Front View

Rear View

2.2 Accessories

Power cable(s)

Iridium antenna(s)

GSM antenna(s)

G-Mouse(s)

Fuse(s)

Ribbon(s)

Magic tape(s)

CD(s)

Multi function cable(o)

SOS cable(o)

SOS button(o)

Temperature sensor(o)

Data cable(o)

Buzzer(o)

Microphone(o)

Speaker(o)

Mushroom Iridium antenna(o)

Camera(o)

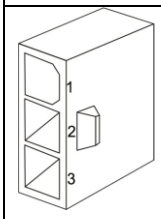
Relay base(o)

Relay(o)

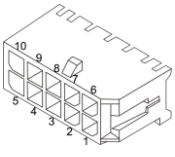
2.3 Interface

SAT-803 main unit provides 12 interfaces, they are power port, multifunction port, 485 port, hand shank port, G-mouse port, Iridium signal LED, Iridium TX/RX LED, microphone port, speaker port, SIM card slot, GSM antenna port, Iridium antenna port.

2.3.1 Power port

Interface	Cable	Definition	Remark
	Pin1(black)	power(-)	
	Pin 2(red)	power(+)	
	Pin 3(orange)	ACC detection	

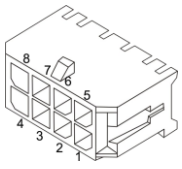
2.3.2 Multi function port

Interface	Cable	Definition	Remark
	Pin 1(green): IN1	On-off input detection cable(1)	Remained
	Pin 2(black/brown): OUT1	Output control cable(1)	Buzzer
	Pin 4(white):IN5	On-off value/analog	Remained

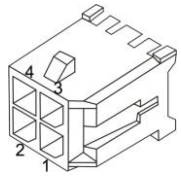
		value input detection(5)	
	Pin 5(purple/brown): OUT2	Output control cable(2) engine cut off	
	Pin 6(blue): IN2	On-off value/analog value input detection(2)	Remained
	Pin 7(grey):IN4	On-off value/analog value input detection(4)	Remained
	Pin 8(yellow): IN3	On-off value/analog value input detection(3)	Door on-off detection cable
	Pin 10(black):GND	Ground	
	Pin 3(purple):SOS_IN	SOS input detection/ LED status	LED indicate working status of main unit
	Pin 9(blue):SOS_LED /Buzzer power		

Multi function port mainly provides I/O control, such as buzzer, engine cut off, door on-off, SOS, etc..

2.3.3 Hand shank port

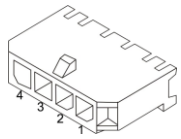
Interface	Definition	Remark
	Pin 5: DC +5V output	
	Pin 1: ground	
	Pin 6: RXD(standard RS232 port)	Main unit communicate with mic
	Pin 2: TXD(standard RS232 port)	
	Pin 7: Mic input plus end	Voice input(inbuilt microphone)
	Pin 3: Mic input minus end	
	Pin 8: voice output plus end	Voice output
	Pin 4: voice output minus end	

2.3.4 RS485 port

Interface	Cable	Definition	Remark
	Pin 1: DC +5V output	Serial port power supply	
	Pin 2: ground		
	Pin 3: standard RS485A port	Data communication	
	Pin 4: standard RS485B port		

RS485 port is to connect with temperature sensor and camera, etc..

2.3.5 G-Mouse port

Interface	Definition	Remark
	Pin1: TXD	
	Pin2: DC +5V output	
	Pin3: ground	
	Pin4: RXD	

2.3.6 GSM antenna port

Interface	Definition	Remark
GSM antenna port	GSM signal input	

2.3.7 Iridium antenna port

Interface	Definition	Remark
Iridium antenna port	Iridium signal input	

2.3.8 LED status

Interface	Cable	Definition	Remark
Iridium Signal LED	Indicate Iridium signal status	Flash when registered; On when registering	

Iridium Transmission LED	Indicate Iridium TX/RX status	Flash when RX; On when TX; or it's off	
GPS LED (on G-Mouse)	GPS LED	Flash when registered; Off when registering	
GSM LED (on SOS)	GSM LED	Flash when registered; On when registering	

3. Features

SAT-803 features can be classified to: connection, positioning& tracking, monitor, alarm, remote maintenance, local maintenance, SMS maintenance.

3.1 Connection

3.1.1 Log in

In GPRS mode, terminal will send log-in package to platform when powers on, wakes up, resets, and switches from Iridium. The package contains device ID.

3.1.2 Log out

In GPRS mode, terminal will send log-out package to platform when it falls asleep and program reset by itself.

3.1.3 Heartbeat

In GPRS mode, terminal will send heartbeat package to platform when it doesn't receive data from platform in preset time interval.

3.2 Positioning& Tracking

3.2.1 Roll call

After receives command from platform, terminal will send GPS information one time immediately.

3.2.2 Timing tracking

After receives command from platform, terminal will send GPS information as preset communication channel, time interval and duration.

3.2.3 Fixed upload

Terminal send GPS information as preset time interval without limited number of times.

Terminal masters 4 kinds of fixed upload method:

1. Given area

   User can preset an area and enable this function: when vehicles drives into it, terminal should upload as preset time interval (remark: supports max 32 areas for each kinds of area, including circle, rectangle and polygon).

2. Given time quantum

   There are max 6 time quantum for both GPRS and Iridium, user can set different time interval for them. GPRS and Iridium's time interval can be

different in a overlap time.

3. ACC ON

   Terminal uploads as preset time interval when ACC is ON.

4. ACC OFF

   Terminal uploads as preset time interval when ACC is OFF.

Notice:

1. Compared with timing tracking and compress upload, fixed upload has lowest priority;
2. Priority of 4 kinds of fixed upload is below:
   Given area>Given time quantum>ACC ON/ACC OFF
3. Priority of given area:
   Circle>Rectangle>Polygon
4. Priority of same kind of given area: based on sequence of the data stored in flash.

3.2.4 Compress upload

Terminal uploads a package compressed by 10 pieces of time-interval data to platform.

Working mechanism: After receives command from platform, terminal will send a response to platform immediately, then it will collect 10 pieces of data by time interval and upload a compressed package.

Notice:

Priority: timing tracking>compress upload>fixed upload

3.2.5 Blind area re-upload

When there's no GSM signal, terminal will collect and store GPS information and upload them by sequence after GSM is connected.

Storage capacity of blind area's data is 3000 pieces.

3.3 Monitor

3.3.1 Voice Monitor

After receives command with monitoring phone number from platform, terminal will callback from GSM channel.

Notice:

Need a microphone to realize this function.

3.3.2 Temperature monitor

After receives command from platform, terminal will upload temperature information as preset communication channel(GPRS or Iridium), time interval and duration.

Notice:

Need a temperature sensor to realize this function.

Device support 1 line temperature sensor.

3.3.3 Engine cut off/revive

When vehicle/ship is stolen, user can issue “engine cut off/revive” command to remote control it.

Working mechanism: its precondition is ACC OFF. If terminal receive command when ACC is ON, it will not work until ACC changes to be OFF.

Notice:

Need a relay to realize this function.

3.3.4 Take photo

After receives command from platform, terminal will take photo by appointed camera and upload by more than one package.

Notice:

Need cameras to realize this function.

Device supports max 4 cameras.

3.3.5 Data unvarnished transmission

Platform can control device to transmit data by unvarnished transmission peripheral.

Notice:

Need unvarnished transmission peripheral to realize this function.

GPRS channel data length capacity is 1kb;

Iridium channel data length capacity is 250bytes;

3.4 Alarm

3.4.1 Speeding

When vehicle/ship has driven faster than preset speed threshold, terminal will upload speeding alarm to platform and prompt with sound locally if preset.

Speeding alarm will be triggered and uploaded only one time no matter platform response or not.

3.4.2 SOS

After user presses SOS button for more than 3s, terminal will upload SOS alarm to platform and prompt with sound locally if preset.

Terminal will keep uploading SOS alarm unless platform responses. The first 3 alarms will be uploaded every 10s, then time interval will change to 3 minutes.

3.4.3 ACC status change

When ACC status changes between ON and OFF, terminal will upload alarm. It contains ACC status, GPS information and mileage.

3.5 Remote maintenance

3.5.1 Remote reset

After receives command from platform, terminal will restart automatically.

3.5.2 Remote initialization

After receives command from platform, terminal will set all parameters(except IP, port, APN, user name, password, device ID) to be default.

3.5.3 Remote upgrade

Upgrade device’s firmware remotely by platform.

3.5.4 Remote set/read parameters

Please see details in platform user manual.

3.5.5 SMS set/read parameters

Please see details in SMS maintain guidance.

SMS Maintain Guide.pdf

3.6 Local maintenance

CASTEL provides professional PC serial port tool: CASTELECOM PCTool. Please see details in CASTELECOM PCTool User Manual.

CASTELECOM PC Tool User Manual

Please log in CASTEL website:http://www.castelecom.com to download PCTool.

4. Installation

! WARNING: below operation is for reference, we suggest the device to be installed by professional engineer. CASTEL will not take responsible for the vehicle circuit fault caused by user's operation.

4.1 SIM card

Insert SIM card before installation of the main unit. Operation steps of which are as follows:

1) Open the side plate of the main unit with screw driver
2) Move the switch near SIM card slot to OFF
3) Insert the SIM cards by directing it at the card seat.
4) Move the switch near SIM card slot to ON
5) Fix the side plate to the main unit, fasten the screw and secure it.

4.2 Cable connection

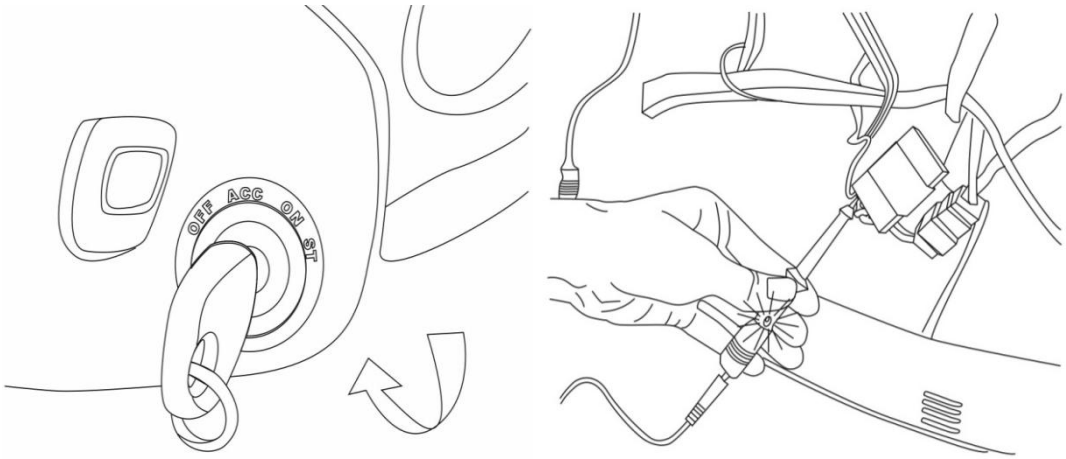
1) Cable Check

Please refer to the following instructions to locate the connection positions of functional cables in vehicle.

(1) Power Cord

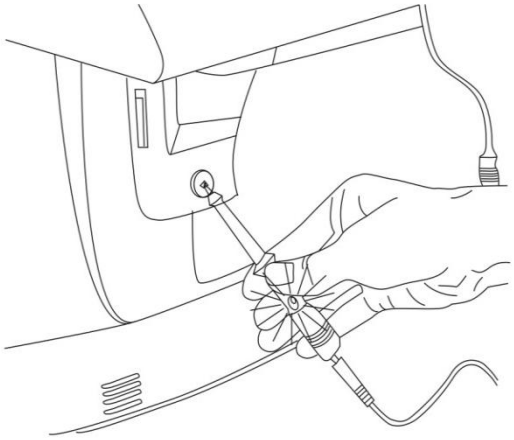
Power cord position: It is generally located in wiring harness inside the lower baffle plate of the steering wheel, or inside the door wiring harness of the driver's seat, or inside the fuse box. It can also be directly connected with the positive pole of the vehicle battery.

Method of locating: ground one end of the test probe and put the other end on the power cord. The key is respectively in the position of OFF, ON or ACC, and the LED indicator of the test probe always lights constantly.



(2) Ground Cord

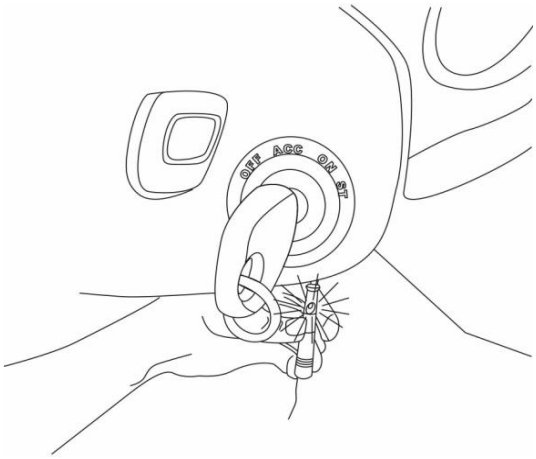
The ground cord of vehicle generally adopts the mode of grounding.



(3) ACC detection cord (IGN+)

ACC detection cord (IGN+) is the basis to judge whether the vehicle's engine is on, and it is located in wiring harness inside the lower baffle plate of steering wheel, or inside the fuse box.

Method of locating: ground one end of the test probe and put the other end on the wire. When the vehicle key is respectively in the position of ACC, ON or START, the LED indicator of the test probe illuminates. When the key returns to the position of OFF, the LED indicator of the test probe goes off.



(4) Door pin Switch

Door pin Switch is to detect door's on/off status, it can be found in wire harness of right front door.

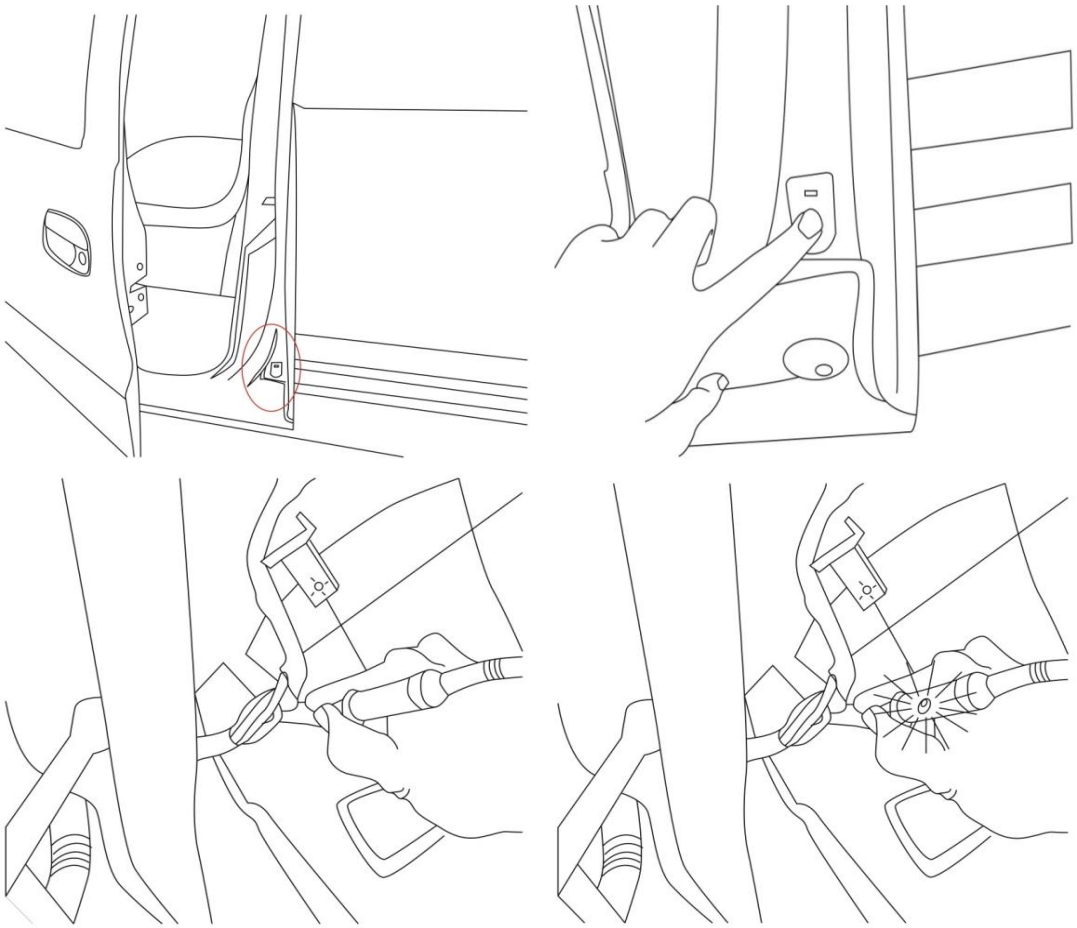
There are high-level and low-level detections of vehicle door pin switch.

!WARNING: The door pin switch detecting wire of MPIP-618W main unit supports low-level detection only. If the vehicle adopts high-level detection, the negative signals must be converted into positive signals through external relay.

The high-level detection mechanism is: When the vehicle door is closed, the voltage of door pin switch is low-level. When the vehicle door is open, the voltage of door pin switch turns into high-level, and the main unit judges that the door is opened;

The low-level detection mechanism is: When the vehicle door is closed, the voltage of door pin switch is high-level. When the vehicle door is open, the voltage of door pin switch turns into low-level, and the main unit judges that the door is opened;

Method of locating: most door pin switches are negative triggering. Connect one end of the test probe with the positive electricity and the other end put on the wire, and the LED indicator of test probe will go off when the vehicle door is closed. The LED indicator of test will light constantly when one vehicle door is opened.



(5) Fuel Pump Cord

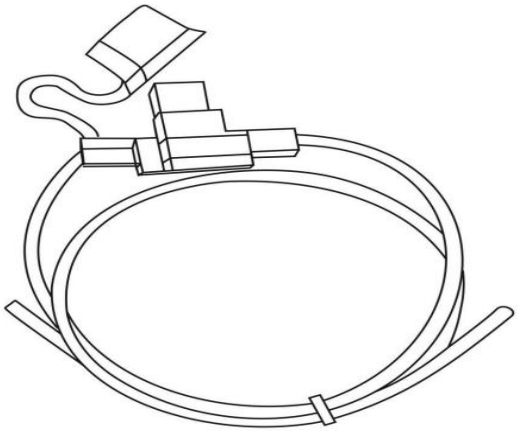
Characteristics of fuel pump cord: When the engine is off, the cord has no voltage signal. When the engine is started, the wire has voltage signal.

Location of fuel pump wire: It is generally located inside the wiring harness of the left or right front door side, or inside the fuse box, or under the back seat, near the fuel tank.

2) Connection between Multi-function Cord and Power Cable

(1) Refer to the explanation of functional ports as shown in the“MPIP-619 Port Connection Diagram”. Connect the ports with vehicle circuit;

(2) Please take out the fuse wire in the fuse base before installation to avoid blowout.



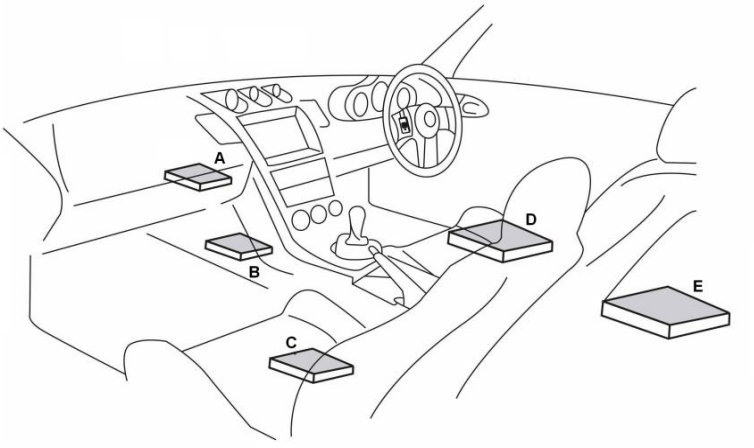
(3) All wire's connection and the part out in air must make insulation protection, to avoid short circuit.

(4) Connection of power cord requires installing the fuse seat in standard accessories within 0.3m length from joint. Principle of local grounding for the MPIP-619 main unit is adopted by the ground wire, and the grounding wire must not exceed 1m long.

4.3 Main unit

(a) Location for installing MPIP-618 should be determined in advance. The location should allow secure installation, concealment, anti-humidity, avoidance of high-temperature area, and be far away from magnetic field, air bag, sound system, ABS system and there sensitive electronic equipment. In addition, it should be installed to conceal.

(b) Recommended installation location for MPIP-619: concealed position inside the decorated board under the dashboard or under the seat. Refer to the following diagram for the specific installation location:

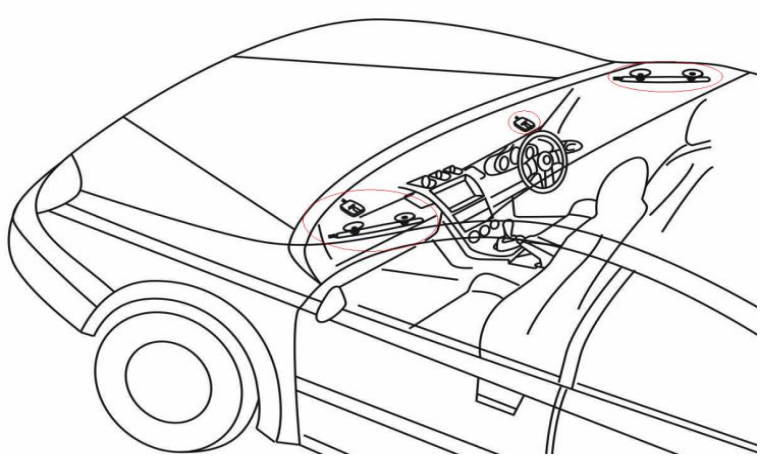


Magic tape can be used to fix the main unit to the vehicle body.

4.4 G-MOUSE

G-mouse cannot be installed under metal baffle plate because it will hinder receipt of GPS signals, thus affecting the normal monitoring and positioning of MPIP-6189 main unit.

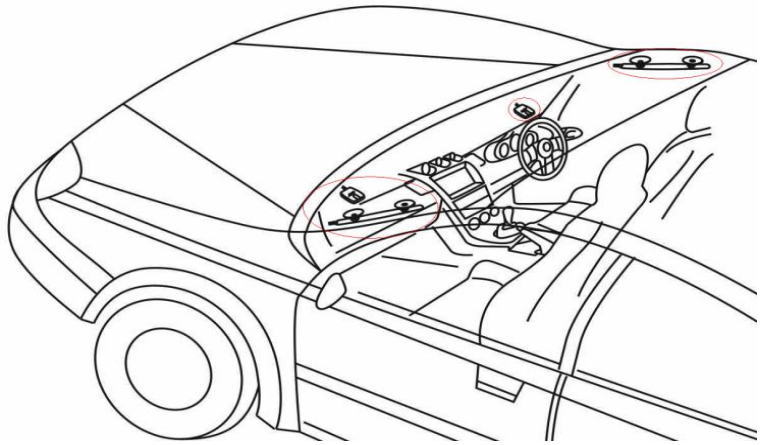
G-mouse is generally placed inside the decorated plate under the front or rear windshield or on the dashboard. Refer to the following diagram for the specific installation location:



Notice: G-MOUSE should be horizontal, the angle between ground should be less than 15 degree.

4.5 GSM antenna

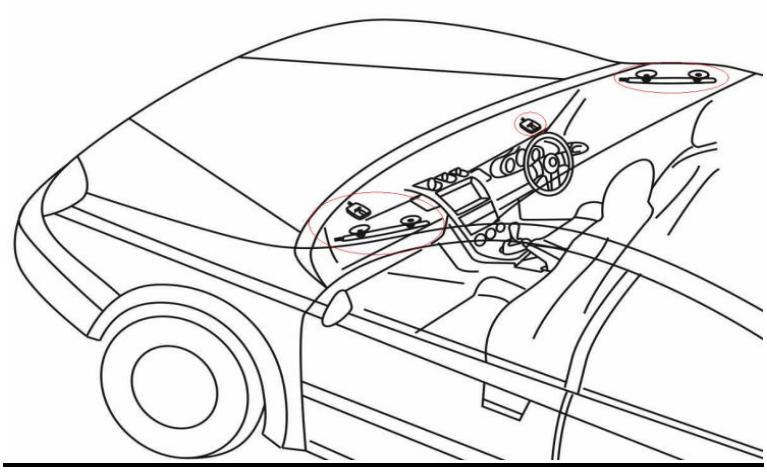
GSM antenna can be installed snugly(not closed), make sure GSM signal is good. Details are as below:



4.6 Iridium antenna

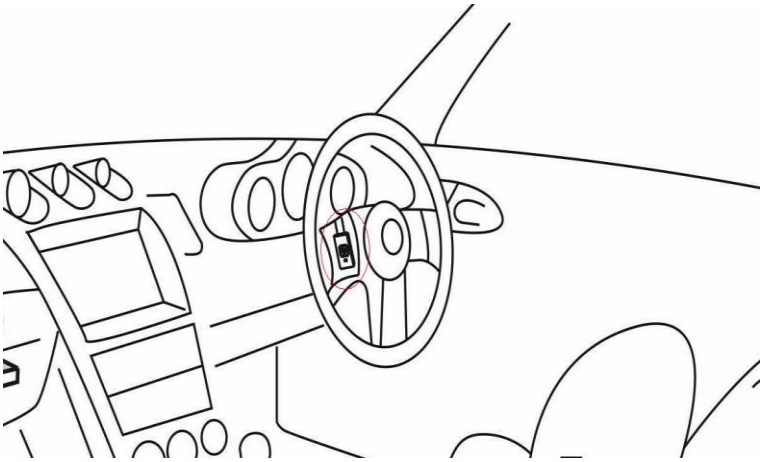
Iridium antenna can not be installed under metal shelter, because it will hinder

Iridium signal.



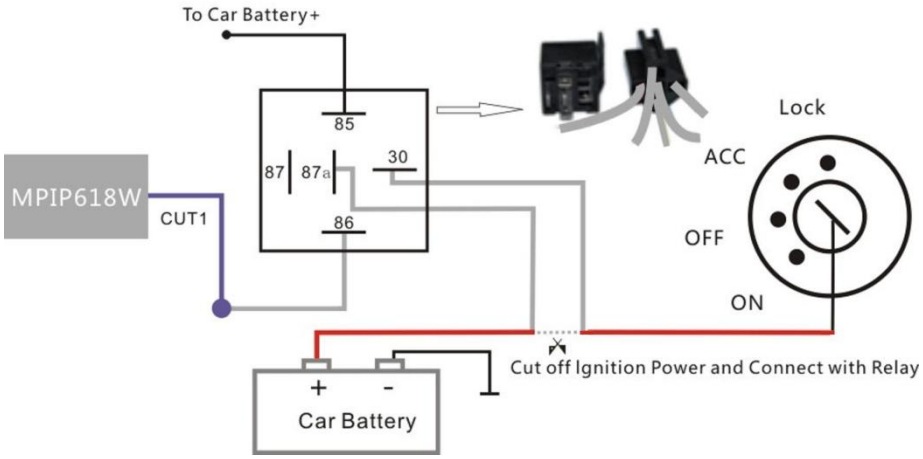
4.7 SOS button

The SOS button should be placed between dashboard and steering wheel to facilitate operation of the driver. The SOS button has adhesive tape stuck to its back. When installing, please remove the adhesive tape and attach it to the intended position. Refer to the following diagram for the specific installation location:



4.8 Relay

1. Connect the CUT1 control line of the multi-function cable with relay 86 pin.
2. Connect the relay 85 with car battery anode, 87a.30 connect with two side of the ACC line as below:



4.9 Finish Installation

1. After all equipments are installed, insert fuse into fuse base to power port on main unit
2. Meanwhile start vehicle to check if device works well.
3. Once notice any abnormality, power off main unit. Recheck all installation wires or send it to a professional vehicle service agent.
4. Log on “Client software of monitoring center” or the “Internet-based WEB vehicle tracking system” to check if the vehicle is online and locating service is normal. If there are problems, refer to Section X of the User Manual for trouble shooting. Contact local dealer if the problems cannot be solved.

5 Specification

5.1 Electronic

Working voltage	9V－36V DC
Communication channel	Iridium SBD and GPRS
Locating method	GPS
MAX working current	<450mA@13.8V(moment max current 2A)
TX/RX current	<350 mA@13.8V
Standby current	<145mA@13.8V（100）
Sleep current	<95mA@13.8V（20）

5.2 Iridium

Module	Iridium 9602
Frequency	1616 ～ 1626.5 MHz
RX sensitivity	-118.5dBm at 50W
Global coverage	
Duplex method	TDD(time division duplex)
Uplink capacity	Max length 340bytes
Downlink capacity	Max length 270bytes
Delay	10—60s(satellite switch)
Impedance	50Ω
Reuse method	TDMA/FDMA
Iridium antenna and port	External antenna, SMA port

5.3 GSM

Module	SIM800H
GSM/GPRS frequency	850/900/1800/1900MHZ
Communication protocol	TCP/IP
RX sensitivity	<-106dBm

Max output power	EGSM900/GT850MHz Class4(2W)，GSM1800/1900MHz Class1(1W)
GPRS multi-channel level	GPRS CLASS 10
Communication compatible protocol	GSM/GPRS Phase2/2+
GPRS movement level	Class B
GSM antenna	External antenna, SMA port(GSM antenna inbuilt for ship version)

5.4 GPS

Module	50 channels u-blox 5 engines GPS L1 C/A code
Service supported	WAAS, EGNOS, MSAS, GAGAN
Max refresh frequency	4 Hz
Accuracy	
Positioning	2.5 m CEP
SBAS	2.0 m CEP
Capture	
Cold boot	32 s
Hot boot	15 s
Auxiliary boot	< 1 s
Sensitivity	
Track	–160 dBm
Re-capture	–160 dBm
Cold boot	–143 dBm
Restrict	
Speed	500 m/s (972 knots)
Height	50,000 m
Installation	External G-Mouse

5.5 Environment

Working temperature	-30℃～＋70℃
Storage temperature	-40℃～＋85℃
Relative humidity	5%～95%

5.6 Machinery

Shell	Aluminum alloy
Dimension	66mm(W)*30mm(H)*110mm(L)
Weight	260g

6 Maintenance

To ensure proper use and extend service life of device, following items should be paid attention to in the course of installation, use, care and maintenance:

1) The voltage range of normal power supply for mobile terminal is DC 9V—36V, and recommended operating voltage is12V or 24V. Prior to installation, user shall make sure the power supply is in the range aforesaid.

2) When the in-Vehicle terminal is powered on, do not plug in or pullout the antenna or remove SIM card to avoid damage to the in-Vehicle terminal and SIM card.

3) The connection socket of the in-Vehicle terminal shall avoid direct contact with conductive body, otherwise it may result in short circuit and danger.

4) Do not use mobile terminal in a dusty environment. When washing the vehicle, try to prevent the terminal from being soaked or showered which will damage the terminal.

5) Keep using the mobile terminal in required temperature. The equipment may be damaged when user operate too long in the environment where the temperature is above 85℃ or lower than -40℃.

6) When vehicle is inside building, tunnel or within a shielded area, receiving of GPS and GSM signals will be affected. After vehicle moves out of the area mentioned above, it will automatically resume.

7) Main unit has built-in spare battery which will not be activated and begin working until the equipment is used for first time with external power. After the battery is activated, the power supply will automatically switch to built-in battery, which can last for about 3 hours (calculated based on that the terminal data transmits 5 minutes per time).

8) Terminal can only use accessories designated or recognized by CASTEL. Unauthorized accessories may damage the device.

9) If abnormality occurs to the terminal equipment or its accessories, which leads to failure of normal operation, please contact the manufacturer or local dealer.

Warranty Card

User Name:_____

Phone No.:_____

Address:_____

Post Code:_____

Purchase date:_____

Device serial No.:_____

Agency and phone No._____

Remark:_____

_____

Please keep this card properly for better service. Please see service details as below.

Agency (Stamp):

Repair Record

Device Model:

Date	Troubles and repair record		Sign(Maintainer)	Sign(User)
	Trouble	Record		

Note: Agency should fill this card completely before repair.

7. Trouble shooting

Description	Causes	Solution
4 LED are all off	No power supply	Check power supply
	Main unit fault	Contact supplier
G-Mouse LED is off	G-Mouse is installed at wrong place	Check whether G-Mouse faces to sky, and make sure there is no metal shelter up above
	G-Mouse broken	Change G-Mouse
	Connection problem between G-Mouse and main unit	Check connection
	Main unit fault	Contact supplier
GSM LED is off (on SOS button)	No SIM card	Inset available SIM card
	No fee in SIM card	Charge the SIM card
	Power switch is OFF	Push the switch near SIM card slot to ON
	Main unit fault	Contact supplier
Iridium LED is off	Iridium module has faulty connection with main unit	Contact supplier
Iridium LED is solid on	Iridium antenna is installed at improper place	Check whether Iridium antenna faces to sky, and make sure there is no metal shelter up above
	Iridium module has not enabled	Contact Iridium operator
Iridium TX/RX LED	Iridium antenna is installed	Check whether Iridium

is solid on	at improper place	antenna faces to sky, and make sure there is no metal shelter up above
Receive SOS alarm repeatedly	SOS button is fault, it can't upspring	Change SOS button
	Platform does not issue alarm confirmation to terminal	Add alarm confirm mechanism in platform
Terminal can't get online(in platform)	GPS uploading time interval is too long	Ser proper time interval
	Platform stops data polling	Platform starts data polling
	SIM card is faulty installed	Re-insert SIM card
	SIM card problem	Make sure SIM card support GPRS and has enough fees
	APN is wrong	Confirm APN value with GSM operator
	IP port is wrong	Set right IP and port
	Power switch is off	Switch on power
	Terminal ID has not been added to platform	Add device ID to platform
Vehicle is running and GPS fixed, but terminal does not calculate mileage and speed is 0	ACC is OFF	Make sure ACC cable is connected
SMS setting is void	SIM card doesn't support SMS	Make sure SIM card in device support SMS;

	Initial cell phone number is not authorized number	Clear existing authorized numbers by initializing command, and use new cell phone number to send a SMS command to device, it will be set to be the super authorized number automatically
	Transnational SMS interact failed	Enable international SMS service
Can’t cut off engine	Engine cut off relay is not fit for vehicle	Passenger car needs 12V relay, heavy duty car needs 24V relay.

8. Claim

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CHINA AEROSPACE TELECOMMUNICATIONS LTD.
Unit 710-711, 7/F, East Wing, No. 10 Science Park West Avenue,
Hong Kong Science Park, Shatin, New Territories, Hong Kong
Tel: (86)755-86018711
Fax: (86)755-86018712
http://www. castelecom.com